

PATENT
Atty. Dkt. No. APPM/4215.Y1/PPC/CMP/CKIM

PENDING CLAIMS:

1. (Original) A method of cleaning a polishing pad surface subsequent to chemical-mechanical polishing (CMP) a wafer surface containing copper (Cu) or a Cu-based alloy, the method comprising applying to the polishing pad surface a cleaning composition comprising:

about 0.1 to about 3.0 wt.% of at least one organic compound containing one or more amine or amide groups;

an acid or a base in an amount such that the composition has a pH of about 5.0 to about 12.0; and

water.

2. (Original) The method according to claim 1, wherein the composition is a solution comprising;

ethylenediamine;

an acid selected from the group consisting of phosphoric acid, acetic acid and sulfuric acid, or a base selected from the group consisting of potassium hydroxide, sodium hydroxide and ammonium hydroxide; and

the remainder deionized water.

3. (Original) The method according to claim 1, wherein the composition is a solution consisting essentially of the organic compound, the acid or base and deionized water.

4. (Previously Presented) The method according to claim 1, wherein the composition is a solution having a pH of about 8 to about 11.

5. (Previously Presented) The method according to claim 2, wherein the organic compound of the cleaning composition interacts with by-products of the Cu and/or Cu-based alloy generated during CMP to form at least one complex that is soluble in water, and the polishing pad surface is rinsed with water to remove the at least one complex.

PATENT
Atty. Dkt. No. APPM/4215.Y1/PPC/CMP/CKIM

6. (Original) The method according to claim 4, comprising applying the solution to a rotating polishing pad at a flow rate of about 100 to about 600 ml/min
7. (Original) The method according to claim 6, comprising applying the solution to the polishing pad for about 3 seconds to about 20 seconds after conducting CMP on each of a plurality to wafers having a surface comprising Cu or Cu alloy.
8. (Original) The method according to claim 1 further comprising rinsing the polishing pad surface with water to remove any cleaning solution from the polishing pad surface, after applying the solution and prior to conducting CMP on a subsequent wafer.
9. (Original) The method according to claim 8, comprising rinsing by applying pressurized water to the polishing pad surface for about 2 seconds to about 20 seconds.
10. (Cancelled)
11. (Previously Presented) The method according to claim 1, comprising conditioning the polishing pad surface before, during and after applying the cleaning solution.
12. (Previously Presented) A method comprising:
 - (a) conducting chemical-mechanical polishing (CMP) on a first wafer surface of a first wafer containing copper (Cu) or a Cu-based alloy on a surface of a polishing pad;
 - (b) removing the first wafer from the pad;
 - (c) applying to the polishing pad surface a cleaning composition comprising:
 - about 0.1 to about 3.0 wt.% of at least one organic compound containing one or more amine or amide groups;
 - an acid or a base in an amount such that the composition has a pH of about 5.0 to about 12.0; and
 - water;

PATENT
Atty. Dkt. No. APPM/4215.Y1/PPC/CMP/CKIM

- (d) rinsing the polishing pad surface with water to remove any cleaning composition on the polishing surface;
- (e) conducting CMP on a second wafer; and then
- (f) repeating (b) through (e).

13. (Original) The method according to claim 12, wherein the composition is a solution comprising:

ethylenediamine;

an acid selected from the group consisting of phosphoric acid, acetic acid and sulfuric acid, or a base selected from the group consisting of potassium hydroxide, sodium hydroxide and ammonium hydroxide; and

the remainder deionized water.

14. (Original) The method according to claim 12, wherein the composition is a solution consisting essentially of the organic compound, the acid or base and deionized water.

15. (Previously Presented) The method according to claim 12, wherein the composition is a solution having a pH of about 8 to about 11.

16. (Previously Presented) The method according to claim 12, wherein the organic compound of the cleaning composition interacts with by-products of the Cu and/or Cu-based alloy generated during CMP to form at least one complex that is soluble in water, and the at least one complex is removed during rinsing.

17. (Original) The method according to claim 15, comprising applying the solution to a rotating polishing pad at a flow rate of about 100 to about 600 ml/min.

18. (Original) The method according to claim 17, comprising applying the composition to the rotating polishing pad for about 3 seconds to about 20 seconds.

19-25. (Cancelled)

26. (Previously Presented) A method of cleaning a surface of a polishing pad, comprising:

conducting chemical-mechanical polishing (CMP) on a first wafer on the surface of the polishing pad;

removing the first wafer from the polishing pad;

applying to the polishing pad surface a cleaning composition, wherein the cleaning composition further comprises:

about 0.1 to about 3.0 wt.% of at least one organic compound containing one or more amine or amide groups;

an acid or a base in an amount such that the composition has a pH of about 5.0 to about 12.0; and

water; and

cleaning the polishing pad surface with the cleaning composition.

27. (Previously Presented) The method according to claim 26, wherein the cleaning composition is a solution comprising:

ethylenediamine;

an acid selected from the group consisting of phosphoric acid, acetic acid and sulfuric acid, or a base selected from the group consisting of potassium hydroxide, sodium hydroxide and ammonium hydroxide; and

the remainder deionized water.

28. (Previously Presented) The method according to claim 26, wherein the cleaning composition is a solution having a pH of about 8 to about 11.

29. (Previously Presented) The method according to claim 26, wherein the cleaning composition is applied to a rotating polishing pad at a flow rate of about 100 ml/min to about 600 ml/min.

PATENT
Atty. Dkt. No. APPM/4215.Y1/PPC/CMP/CKIM

30. (Previously Presented) The method according to claim 26, wherein the cleaning composition is applied to a rotating polishing pad for about 3 seconds to about 20 seconds.
31. (Previously Presented) The method according to claim 26, further comprising rinsing the polishing pad surface with water to remove any cleaning composition on the polishing surface.
32. (Cancelled)
33. (Previously Presented) The method according to claim 2, further comprising: rinsing the polishing pad surface with water.